Geophysical Research Abstracts
Vol. 15, EGU2013-1874-2, 2013
EGU General Assembly 2013

Phytoavailability of thallium – A model soil experiment

Ales Vanek (1), Martin Mihaljevic (2), Ivana Galuskova (3), and Michael Komarek (4)

(1) Czech University of Life Sciences Prague, Praha 6, Czech Republic (vaneka@af.czu.cz), (2) Charles University in Prague, Praha 2, Czech Republic (mihal@natur.cuni.cz), (3) Czech University of Life Sciences Prague, Praha 6, Czech Republic (galuskova@af.czu.cz), (4) Czech University of Life Sciences Prague, Praha 6, Czech Republic (komarek@fzp.czu.cz)

The study deals with the environmental stability of Tl-modified phases (ferrihydrite, goethite, birnessite, calcite and illite) and phytoavailability of Tl in synthetically prepared soils used in a model vegetation experiment. The obtained data clearly demonstrate a strong relationship between the mineralogical position of Tl in the model soil and its uptake by the plant (Sinapis alba L.). The maximum rate of Tl uptake was observed for plants grown on soil containing Tl-modified illite. In contrast, soil enriched in Ksat-birnessite had the lowest potential for Tl release and phytoaccumulation. Root-induced dissolution of synthetic calcite and ferrihydrite in the rhizosphere followed by Tl mobilization was detected. Highly crystalline goethite was more stable in the rhizosphere, compared to ferrihydrite, leading to reduced biological uptake of Tl. Based on the results, the mineralogical aspect must be taken into account prior to general environmental recommendations in areas affected by Tl.